ARGUMENTS/COMMENTS

Claims 1 through 3, 5, 6, 9, 14 and 59 through 66 are pending in the present application. Claims 1, 3, and 6 have been amended.

In the Office Action, claims 1, 2, 5, 6, 9, 14 and 62 were rejected under 35 U.S.C. 102(b) a being anticipated by U.S. Patent No. 1,841,762 to Samesreuther et al. (hereinafter "the Samesreuther et al. patent") Applicants respectfully disagree.

In the Office Action, claims 1, 14 and 61 were rejected under 35 U.S.C. 102(b) as being anticipated by Baumann (hereinafter "the Baumann patent"). Applicants respectfully disagree.

Claim 1 is directed to a heat exchanger to control the temperature of a process fluid in a reaction system. The heat exchanges includes a reaction vessel containing the process fluid; a plurality of heat transfer conduits around the circumference of the reaction vessel to provide a heat transfer surface between the heat transfer conduits and the reaction vessel. The heat transfer conduits number from 10 to 200 and carry a flowing heat transfer fluid and no one of the 10 to 200 heat transfer conduits carries more than twenty percent of the heat transfer fluid. Each of the 10 to 200 heat transfer conduits extends around the circumference of the reaction vessel and has a length of at most twice the circumference of the vessel and a cross-sectional area of less than 500 square millimeters to thereby minimize the heat transfer fluid that is supplied to each of the 10 to 200 heat transfer elements.

The Samesreuther et al. patent is directed to a heat exchange wall for container in which the tubes are welded and interfaced with copper to provide a heat transfer surface. The Samesreuther et al. patent is directed to qualitatively cooling or heating the contents of the container. Samesreuther

does not disclose the control of a reaction.

The Baumann patent is directed to cooling pipes for a generator that having either a conical or a stepped configuration towards the exit of the pipe and varying wall thickness to provide cooling to the widely differing temperatures in the generator. Baumann is concerned with the cooling of hot ionized gas produces by a reaction performed elsewhere it is not concerned with the control of the temperature of a reaction.

Claim 1 has been amended. Claims 1, 2, 5, 6, 9, 14 and 62 are rejected as being anticipated by Samesreuther and reference is made to the rejection in the previous action. Samesreuther does not disclose the use of 10 to 200 conduits and furthermore does not disclose that each conduit should have a cross sectional area of less than 500 square millimeters. In addition Samesreuther does not disclose that each conduit should extend around the circumference of the vessel. Claim 1 is therefore not anticipated by Samesreuther.

Claims 1, 14 and 61 are rejected as being anticipated by Baumann.

In Baumann the conduits do not extend around the circumference of the reaction vessel, it is clear from Figure 1 and Figure 2 and lines 44 to 46 of column 1 that they extend parallel to the axis of the vessel. Furthermore Baumann does not disclose that the cooling pipes should have a cross sectional area of less than 500 square millimeters. Claim 1 is therefore not anticipated by Baumann.

The benefits obtained from the invention are described on pages and 8 of the Arguments/Comments filed on 26 January 2009.

Accordingly, independent claim 1 and dependent claims 1, 2, 5, 6, 9, 14,

61and 62 are not anticipated by either the Samesreuther et al. patent or the Baumann patent.

Claims 1, 14 and 61 are rejected as being obvious over Baumann in view of Matsumoto.

Matsumoto does not, as suggested in the rejection, teach that it is known to provide enclosed vessels with either serially connected or parallel connected flow passages for heat exchange fluid in the jacket surrounding the vessel. Column 2 lines 5 to 7 of Matsumoto make it clear that Matsumoto is concerned with avoiding providing cooling means outside the vessel. The combination of Baumann (longitudinal external cooling tubes) and Matsumoto (cooling pipes *within* the vessel) does not arrive at the claimed plurality of external pipes extending around the circumference of the vessel.

The limitations that:

i) the conduits each extend around the circumference of the vessel

ii) there are from 10 to 200 conduits

iii) the conduits are of cross sectional area less then 500 square millimeters

are all structural limitation not disclosed in the prior art.

In the Office Action, claims 3 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Samesreuther et al patent. Applicants respectfully disagree.

Samesreuther et al. as indicated above does not disclose or suggest the limitations of claim 1 or the claims that depend therefrom. Accordingly, claim 3 is not made obvious by the Samesreuther et al. patent.

In previous office action claim 3 was rejected as being unpatentable over Samesreuther in view of the statement that the tubes could be of any desired diameter. It was furthermore stated that it would have been obvious to one of ordinary skills in the art at the time the instant invention was made to select an appropriate diameter for a given application of the disclosed heat exchange wall. Samesreuther was published in 1932 and no subsequent reference has been cited to support this allegation.

Furthermore there is no suggestion that reactor temperature control can be improved by employing the number of conduits each having the specified small area of cross section. This combination is therefore non-obvious and patentable over Samesreuther.

The claims are therefore not obvious over Baumann in view of Matsumoto.

Traditional techniques for temperature control of reactions have been based on jackets around the reaction vessel providing high volumes of heat transfer fluid through single or a few conduits of large cross section. Attempts to increase the speed of response to temperature change of those systems by using a reduced the volume of fluid flowing at a faster rate failed because the fluid channelled in the conduit. This problem has been overcome by the present invention that employs a large number of conduits of small cross-sectional area allowing a much more rapid response to temperature changes.

This may be illustrated by the consideration of a batch reaction vessel with a capacity of say 5000 litres. Traditionally the temperatures of these reactions has been controlled by a jacket containing 500 to 800 litres of heat transfer fluid or by a half coil system containing 200 litres of fluid. It will be appreciated that in these systems if a change in the temperature of the heat transfer fluid is required for the control of the temperature of the process fluid it will require some time to alter the temperature of such a large volume of heat transfer fluid.

As is set out at the top of page 3 of the application much faster response and therefore improved temperature control of the reaction fluid can be achieved by employing the plurality of conduits of small cross-sectional area. This is further explained on page 25 of the application. In addition the use of these conduits allows improved temperature control to be achieved with a dramatically reduced volume of heat transfer fluid; for example, the temperature of a 5000 litre reactor can be controlled with as little as 10 litres of heat transfer fluid.

Reconsideration and withdrawal of the 35 U.S.C. 103(a) rejection are respectfully requested.

In view of the above, it is respectfully requested that the present application is in condition for allowance. Favorable consideration of the present application is respectfully requested. Applicants will contact the Examiner in this application to request an interview to advance prosecution.

Consideration and allowance of application is respectfully requested.

Respectfully submitted,

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